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IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES.

REPORT
ON THE
AGRICULTURAL DEPARTMENT, ST. VINCENT,
FOR THE YEAR
1930.

TRINIDAD.
ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE
FOR THE WEST INDIES.

1931.

[Price Sixpence.]

REPORTS

ON THE

BOTANIC STATION, ECONOMIC PLOTS, AND AGRICULTURAL EDUCATION, ST. VINCENT.

Annual Reports on certain Economic Experiments conducted in connexion with the Botanic Station, 1900-2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments, and Agricultural Education for the years 1902-3 to 1918-30.

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LETTER OF TRANSMITTAL.

THE ADVISORY DEPARTMENT,
IMPERIAL COLLEGE OF TROPICAL AGRICULTURE,
TRINIDAD.

Ref. No. C.A. 388. 16th June, 1931.

Sir,—I have the honour to transmit herewith the Report of the Superintendent of Agriculture on the St. Vincent Agricultural Department for the year ended December 31st, 1930.

2. A matter of far reaching importance was the re-establishment during the year of the cotton research station and the appointment of a whole time Cotton Research Officer, funds having been provided for this purpose by the British Cotton Growing Corporation. A visit paid by Professor Cheeseman, at the request of the Commissioner of Agriculture, earlier in the year, indicated that all was not well with the cotton position in St. Vincent and that careful work was required to improve matters. The generous action of the Corporation is much appreciated by all parties concerned.

3. It was also found possible to secure the services of Professor Shephard to report on the condition and future prospects of the Agricultural Credit Society movement in the Island. Professor Shephard's report is now receiving consideration.

4. The changing of the cotton planting season promises to be a step in the right direction and one that is likely to result in the improvement of the quality of the product.

5. The establishment of the arrowroot pool, a problem with which Your Honour had been so closely identified, was successfully accomplished during the year, and will it is hoped be of material help to the industry.

6. The activities of the Fruit and Vegetable Bureau promises to be of increasing assistance to the peasant community and steps are being taken to extend the usefulness of this organisation.

I have the honour to be

Sir,

Your obedient servant,

(Sgd.) G. A. JONES,
Acting Commissioner of Agriculture,
Imperial College of Tropical Agriculture.

His Honour
THE ADMINISTRATOR,
St. Vincent.

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Staff of the Agricultural Department, St. Vincent.

Agricultural Superintendent and Inspector, Agricultural Credit Societies	T. P. Jackson.
Foreman, Experiment Station, and Agricultural Instructor (Seconded for duty in Grenada since June, 1930)	F. A. Simmons.
Foreman, Experiment Station, and Agricultural Instructor (Acting since June, 1930)	L. Brown.
Cotton Inspector and Government Vaccinating Officer ...	L. Brown.
Foreman, Botanic Station and Inspector, Cotton Stainer Control	R. Vanloo.
Officer in Training	A. Duncan.
Clerical Assistant	Miss D. E. Wall.

COTTON RESEARCH.

Provided by the Empire Cotton Growing Corporation.

Cotton Officer from July 31st ...	S. H. Evelyn, D.I.C.T.A.

REPORT ON THE AGRICUTURAL DEPARTMENT, ST. VINCENT.

FOR THE YEAR ENDED DECEMBER 31st, 1930.

With the exception of the sections "Notes on the Cotton Experiment Station", "Report on the Government Fruit and Vegetable Bureau" and "Report on the Government Cotton Ginnery", this Report was written by the Agricultural Superintendent.

Work in the Botanic Gardens and Observations on Plants.

The rainfall measured at the Botanic Gardens for the year was 80·47 inches. It was 16·47 inches less than that recorded for 1929. With the exception of the years 1923 and 1926 the period under report has been the driest for 37 years, and the difference between the rainfall of those two years and the past one was very slight being in one instance 0·97 of an inch and in the other 1·30.

The island is singularly fortunate in that it did not experience any of the hurricanes which proved so disastrous to some of its sister Colonies.

Several moderately large specimen plants were lost on account of drought conditions, but fortunately there are duplicates of these growing. The largest specimen of the Sealing Wax Palm, (*Crytostachys Lakka*, Becc.), growing in the Gardens, died. This has been in indifferent health for some time.

There are three specimens of the genus Juniperus growing in the St. Vincent Gardens, these are *J. pachyphlaea*, *J. sempervirens* and *J. Bermudiana*. The first mentioned is by far the most striking of the three, possessing as it does foliage of a silver grey. Originally there were three of these growing in the Gardens, but one died some years ago. There are also two plants of The Pencil Cedar, (*J. Bermudiana*) which are some thirty to thirty-five feet high and were planted in 1913 by His Honour the Honourable Gideon Murray, now Lord Elibank. There is only one plant of *J. Sempervirens* and this is a healthy specimen, some twenty feet high.

The Mangosteen (*Garcinia Mangostana*) set a few fruit during the year. Most of them were unpalatable on account of the formation both inside and outside of a yellow astringent fluid.

During the years 1929 and 1930 the Clove tree (*Eugenia caryophyllata*, Thunb) bore fruit. This is interesting in that it is seldom that fruits are formed two years in succession ; as a rule, they are borne in alternate years. The Clove tree was introduced into the St. Vincent Gardens about 1787, from the French Islands, to which they had been brought from Asia.

The Nutmeg trees when fruiting always prove interesting to visitors from Temperate Climates. Although old trees, they produce fair crops and are in good health. It is recorded that Nutmegs were introduced into St. Vincent from Cayenne in 1809, after having been nursed in Trinidad, but it is more than probable they were introduced earlier, i.e., in 1802.

There is a fine old mango tree known locally as "Big Web" which grows near the quarters of the Agricultural Superintendent. It is reputed to be one of the first mango trees imported into St. Vincent. There are two other mango trees which bear the same tradition ; these are growing in Government Office Yard. Records to substantiate these statements cannot, however, be found.

A concrete drain, approximately 186 feet long was made ; this is situated to the North of the Summer House, at right angles to it.

Plant Importations.

Two cuttings of the sugar cane variety P.O.J. 2725 were imported during the year from the Agricultural Department, St. Lucia. The St. Vincent Agricultural Department has now both of the well known P.O.J. canes, the one just mentioned and P.O.J. 2878. Cuttings of these for distribution will be ready in the near future. Seven varieties of Avocado pear, and ten varieties of Citrus plants, and Citrus budwood, were also imported from St. Lucia.

Seeds of *Hydnocarpus anthelmintica*, one of the trees producing Chaulmoogra Oil, were received from India, through The Honourable the Chief Medical and Health Officer.

Work in Nurseries and Distribution of Plants.

The following is a list of plants, seeds, etc., distributed from the nurseries attached to the Botanic and Experiment Stations :—

Economic and Decorative Plants.

Tomato	142,000
Onion	45,000
Lime	7,067
,, (grafted)	270
Miscellaneous decorative	711
Mangoes (grafted)	477
Grape Fruit and Tangerine Orange ...	158
Orange (budded)	86
Miscellaneous economic	107
Coco-nut	84
Mango	50
	196,010

Cuttings.

Sweet Potato	63,575
Cassava	10,600
	74,175

Seeds.

Black Eye Peas	1,103	lb.
Cotton Seed	1,055	,,
Ground Nuts	82	,,
Arrowroot rhizomes	400	,,
Miscellaneous	8	,, 40 packages.
	2,648	,,

From the above it will be seen that large numbers of tomato plants were raised and distributed from the nurseries. These were raised in boxes. Onion plants to the number of 45,000 were grown in seed beds, and from these they were lifted and sent out for planting purposes. Seven thousand three hundred and thirty seven lime plants were distributed. Of these, 270 were inarched on sour orange stock ; at the end of the year there were more than 1,000 of these

ready for transplanting into permanent positions. The large number of 477 grafted mango plants were grown and sold to planters, in addition Officers of the Agricultural Department top worked, with budwood from the variety "Julie", 425 common mango plants. From this it will be seen that more than 900 Julie mango plants were either planted out or converted during the year. At the time of writing there are some 500 budded orange and grape fruit plants in the nursery ready for distribution. The number of plants sent out during 1930 constitutes a record.

A very large number, some 74,000 sweet potato and cassava cuttings were distributed. The majority of the sweet potato cuttings distributed was the popular variety V. 59 raised some years ago by the Agricultural Department.

Inspection and Fumigation of Imported Plants and Seeds.

The following is a list of plants, etc., which were imported and fumigated under the Importation of Plant Diseases Prevention Ordinance, 1906 :—

Vegetable Seeds	90	parcels
Flower ,, ...	13	,,
Miscellaneous ornamental plants ...	29	,,
Miscellaneous plants	59	,,
Bulbs	2	,,

Notes on the Cotton Experiment Station August 1930—January 1931.

The following was written by Mr. S. H. Evelyn, Cotton Officer, St. Vincent.

The work outlined by Doctor Harland and carried out at the Station during the above mentioned period falls under five main heads :—

(1) The production in a pure state of two commercial strains (1) Superfine and (2) Ordinary.

The results of the analytical work, performed by the writer in August 1930, on samples of the strains grown at the Station, demonstrated the fact that, comparatively speaking, quite a fair amount of pure material was available for experimentation. From the lint and seed analysis of this material the best pure strains were selected and planted out in progeny rows in September. The bulk analysis of these strains has been completed and the best strains have been selected by Doctor Harland for retesting next year.

(2) The attempt to produce new commercial strains superior to either of the above.

Besides the testing out of certain strains the lint and seed analysis of which indicate a possibility of their surpassing the strains at present cultivated, hybridization has been effected between the local and certain introduced strains with the same object in view. No indication can, however, be given of the results of this hybridization work until next year.

(3) *Potash Campaign.* Employing Beavens Half Strip method, experiments to demonstrate the value of potash to cotton soils were conducted at three estates. Unfortunately the alleged pure seed used proved to be so impure that no definite interpretation can be adduced from this season's results. Pure seed will, however, be available next season when the experiment will be repeated.

(4) The testing out of Moco as a possible substitute for the Perennial strains at present cultivated in the drier Grenadines.

A limited number of seeds of Moco, one of the Bourbon cottons, which Doctor Harland, while in Brazil, found growing and giving excellent yields under a rainfall of 12 inches per annum, were sown this season in a plot adjacent to selections of the strains chiefly cultivated in the drier Grenadines. It is apparent that under the conditions obtaining this season the Moco strains are much superior to those now cultivated.

(5) *Special Problems.*

(*a*) The production of a non-shedding strain.
(*b*) The production of a high bolling strain.
(*c*) The testing out of the corellation between Tuft Grade and Lint Index.
(*d*) To determine the period at which to apply fertilizer to the cotton plant.

In the first two experiments very promising strains have been selected and will be retested next season.

Due to the impurity of the seed no results were obtained from Problem (*c*). Results are now coming in for Problem (*d*) and though they appear promising it is too early to say anything definite.

Mutations. Two uncommon mutations appeared this season. Both of these are male sterile. They will both, however, cross with normal Sea Island. Seeds have been obtained from the DB Man Cotton, but on account of Pink Boll Worm no seeds of the cross, Leaf Distorted X Sea Island, have so far been obtained. It is hoped, however, that good seeds will be obtained from the bolls now on the tree.

Experiments with Ground Provisions, etc.

Cassava Seedlings.

A varietal experiment with the cassava seedlings raised some time ago was laid out. These, at the time of writing have not been reaped.

Ground-Nuts.

Experiments were carried out with four varieties of ground-nuts. These were planted on July 14th and reaped on November 16th. The area of each plot was 240 square feet. There were four plots of each grown. The results were masked by damage done to the crop by rats and poultry. The following figures give the mean calculated yield per acre for each variety :—

Virginia	...	771 lb
Local	...	721 ,,
African	...	680 ,,
Improved	...	544 ,,

The variety Virginia heads the list, but past records indicate that this is a shy bearer. As a rule Local gives a better return.

Broom Corn.

A $\frac{1}{10}$ acre plot of this was planted on July 1st and was reaped on November 7th, it yielded at the rate of 7,150 lb. of heads per acre.

Some few peasants grew this crop during the year, and a start has been made in the making of brooms. At the time of writing some are on sale at the Government Fruit and Vegetable Bureau.

Soya Bean.

Two varieties of Soya Bean were grown. One variety was originally obtained from the Agricultural Department, British Guiana, and the other from the Soya Flour Company, London. Seeds were sown on May 26th and the plants were destroyed on October 8th. The area of each plot was $\frac{1}{7}$ acre.

The variety obtained from British Guiana grew to a height of 3 feet 3 inches, and gave a yield of beans at the rate of 422 lb. per acre. The other only grew to a height of some 3 inches and yielded very sparsely.

The first mentioned variety gave a yield much better than when grown for the first year. This may prove a valuable addition to the bean crops of St. Vincent.

Upland Rice.

The three varieties of Upland Rice imported during 1929 were planted in July. Subsequently a spell of dry weather was experienced from which the plants did not recover. Further trials will be made with this crop.

Vegetables.

Several varieties of vegetables were tested out during the year, and the information obtained may be of use to persons who contemplate growing them for either home consumption or export.

Beet. Six varieties of beet were grown during the year, these were Early Model, Early Wonder, New Oval Gem, Crosbys Egyptian, Henderson's Electric and Crimson Globe. The seeds were sown on December 15th, in drills nine inches apart, in beds 240 square feet in area and the last root was reaped on February 6th.

Early Model. This beet possesses oval medium sized well shaped roots which are of excellent colour after being cooked. The flavour will suit persons who like a somewhat sweet tasting beet. The germination of the seed was good and the quantity of produce reaped from the plots was 60½ lb.

Early Wonder. This variety does not possess the same sweet flavour as the preceding one, and may on this account be preferred by some people. The roots are moderately large, and of a deep red colour. The seeds germinated moderately well and 42 lb. were harvested from the plots on which it was grown.

New Oval Gem. This beet possesses a distinctly sweet flavour and has medium sized roots. The germination of the seeds however, was indifferent and only 37 lb. were reaped from the plot.

Crosby's Egyptian. This variety possesses rather large and slightly flat roots, the flesh of which is not so deeply coloured as that of the other varieties reported on. On this account it would not appeal to a number of people. Thirty seven pounds of roots were obtained from the plot on which this was grown.

Crimson Globe. This variety is one that is on the whole popular in the West Indies, it has roots from two to three inches in diameter which are of a deep crimson colour. The return from the plot on which this variety was grown was 50 lb. The flavour is excellent.

The seeds of *Henderson's Electric* germinated badly but the colour of the roots was quite attractive and as would be expected the return was quite small.

Carrots. The following varieties of carrots were grown, Selected Danvers, Improved Long Orange, Intermediate, and Henderson's Tender Sweet. The areas of the plots on which these were grown were similar to those of the beet. Seeds were planted on November 30th and reaping was completed on February 6th. Only one of these varieties, *i.e.*, Selected Danvers gave anything approaching a good yield and this was only 17 lb. to the plot. The roots were short being only two to three inches long but the flavour was good. This variety would only be suitable for local consumption.

As the poor yields were due wholly to faulty germination, it may not be out of place to say a few words about the quality of the produce.

Improved Long Orange. The length of the root of this variety is from 8—12 inches; it will be useful either for shipping or local use.

Intermediate. About 50 per cent of the roots of this variety were of good shape and from about 8-12 inches long; the remainder were much shorter and sausage-shaped.

Tender Sweet. A large proportion of the roots of this variety, about 80 per cent, were distorted and badly shaped. Some 10 per cent were long and of excellent shape.

Cucumbers. Seeds of the following varieties of Cucumbers were imported and grown:—Longfellow, Long Green, Cool and Crisp and Davies Perfect.

Seedlings were planted out on October 31st and plants were destroyed on December 31st the area of land occupied by each variety was 27 square yards.

Longfellow. This variety was the best of the four that were grown. It is of vigorous habit, and the fruits are slow to ripen. In shape they are slightly curved, and are of a dark green colour. This gave the highest yield of any variety tried. The weight of fruit from the plot occupied by this was 35 lb., this cucumber could be grown either for export or for local consumption.

Long Green. This variety ripened its fruit early, and quickly assumes a yellowish colouration: They are cylindrical in shape and would not be suitable for export purposes. The yield was at the rate of 30 lb. per plot.

Cool and Crisp. This variety is a popular one in the West Indies. It produces fruit of a medium size and of a dark green colour, it takes some time after maturing to yellow. The variety would be useful for export. The yield was at the rate of 30 lb. to the plot.

Davis Perfect made slow growth, the fruits were small in size, they were irregular in shape and it was quite apparent that this variety will not thrive under conditions obtaining in St. Vincent.

Watermelons. Three varieties of watermelons were grown. These were Coles Early, White Seeded Chilian, and Tom Watson. The area occupied by each variety was 53 square yards. Seeds were sown on November 12th and the plants were destroyed on February 8th.

Coles Early produced rather small fruit about 9 inches in diameter, the flavour and the keeping qualities of which are decidedly good. The yield per plot was only 26 lb. which was poor although better than that of the other varieties. In colour the outside of this is variegated, being green and white; the flesh is deep red in colour, and would undoubtedly be useful for shipping purposes.

White Seeded Chilian produced fruit slightly smaller than the variety previously mentioned. The outside colouration is dark green and the flesh light pink. It does not possess a good flavour and the yield was at the rate of 21 lb. per plot.

The variety, *Tom Watson* produced a somewhat long oval shaped fruit dark green in colour with bright red flesh, the flavour of which was indifferent, the yield was at the rate of 17 lb. per plot.

Muskmelon or Cantaloupe. Trials were made with three varieties of Muskmelons, *i.e.*, Hales Best, Emerald Gem and Early Hackensack. Seedlings of these were planted on November 30th. The fruit produced from each variety was small in size and indifferent in flavour. It was quite evident that the conditions obtaining at the Experiment Station were in no way suitable to the varieties tried.

Sweet Peppers. Six varieties of sweet peppers were imported for trial purposes, these were California Wonder, Ruby King, Early Giant, Crimson Giant, Chinese and Pimiento. Although at the time of writing trials with sweet peppers are not concluded they have gone sufficiently far to show which of these varieties are suitable to conditions under which they were grown. The plants were planted out in November 15th.

California Wonder. This variety is the most prolific of the six tried. It produces large fruit 5—6 inches long and when ripe has a vivid scarlet colour, possessing a particularly mild flavour. It is a variety that could be grown for export.

Ruby King. The fruit of this is smaller than that produced by the preceding mentioned variety. It is usually three or more lobed, the flavour is good and would also be useful for export purposes.

Early Giant. This is somewhat dwarf in habit with fruit varying in size, the largest being 5 inches by three and a half. When ripe the colour is good.

The fruit of *Crimson Giant* when ripe is a bright scarlet colour, it is apparently a shy bearer. *Chinese Giant* and *Pimiento* are also shy bearers.

Tomatoes. The variety of tomato that is grown in St. Vincent for the Canadian Market is Bonny Best. This is a good all round variety. Seeds of a tomato variety were imported from Teneriffe and tried against it. The area of the plots were each 133 square yards and were planted on November 14th and 15th. Teneriffe yielded at the rate of 8,022 lb. to the acre and Bonny Best 6,788 lb. Teneriffe was less susceptible to Blossom End Rot than Bonny Best; 6 per cent of fruit of the former variety were attacked and 14·7 of the latter.

A plot of the variety Teneriffe planted on May 12th, which was 80 square yards in area yielded at the rate of 8,892 lb. to the acre, very much on a par with that obtained during the trial mentioned above. On this occasion 6·7 per cent of the fruit were attacked by Blosson End Rot.

The average number of fruit borne per plant by Teneriffe was 16·6 and that borne by Bonny Best 9·6. The highest numbers borne by individual plants were 39 and 16 respectively.

Seeds of Marglobe and the Fruit Tomato were also tried. The attacks of Mole Crickets were so severe as to mask results. Marglobe is a heavy yielding tomato. It is however, susceptible to Blosson End Rot. Twenty-nine per cent of the fruit were attacked. The Fruit Tomato is less susceptible than Marglobe to this disease, 11·8 per cent were attacked. Both these varieties are of excellent flavour and further trials will be made.

Onions. A plot of Bermuda onions, 133 square yards in area was planted on December 12th, reaping was completed on March 10th. This yielded at the rate of 2,399 lb. per acre. The bulbs were of medium size, clean and free from disease.

Egg Plant. Three varieties of Egg Plant were grown; the germination of the seeds was indifferent and the plants in their early stages experienced a sharp spell of dry weather. Sufficient knowledge was obtained from these trials to indicate that the varieties Black Beauty and New York Spineless would be suitable for Northern Markets. The fruit of both are handsome looking. Early Long Purple possesses an ugly club shaped fruit which would militate against its sale.

Work connected with Insect and Fungus Pests and their control.

The Cotton Worm (*Alabama argillacea.* Hubn.)

During the latter part of 1930 there were weak attacks of cotton caterpillars experienced in Southern parts of the island and on the Leeward Coast. In some cases dusting with arsenicals was resorted to; the attacks did not develop. Jack Spaniards were very common in fields where cotton worms were found.

The Pink Bollworm (*Platyedra gossypiella*).

The pink bollworm first made its appearance during the present season on cotton growing at the Experiment Station on January 28th. This was 146 days after it was planted. During the previous season, 1929-30, the pest was noticed on cotton 129 days after the crop was planted, and during the season previous to this larvæ of the insect were found on the corollas of cotton flowers 59 days after the seeds had germinated.

The Cotton Stainer (*Dysdercus delauneyi*).

The work carried out during the year for the control of cotton stainers was on similar lines to that of previous seasons.

The Close Season for cotton was from June 30th to August 31st 1930.

Twenty Silk Cotton trees were destroyed during the year.

In the following table the number of stainers accounted for at the Experi- Station for eight years is given :—

TABLE.

Months.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.
January ...	37,878	20,086	1,449	2,850	...	29,298	120	63
February ...	63,800	2,800	7,723	...	105	7,217	7,668	91
March ...	51,880	930	6,231	791	1,072	909	7,460	405
April ...	3,002	1,225	2,400	5,136	334	42,648	...	13,560
May ...	817	52	716	100	3,660	...	273	4,430
June ...	908	...	...	...	3,060	101	163	...
July ...	550	...	...	...	...	2	20	673
August ...	87	...	1	...	...	705	1,597	179
September ...	3	...	1	...	...	973	1	...
October ...	8	...	...	...	...	758	...	...
November ...	...	...	...	...	...	538	...	...
December ...	377	57	550	...	150	...	1	...

It will be seen from the above that stainers were at no time present in quantities at the Experiment Station during the year.

Red Ring of Coco-Nuts.

This disease is caused by a nematode worm (*Aphelenchus cocophilus*) which in the adult stage is $\frac{1}{25}$ of an inch in length. A somewhat detailed description of this nema was given in the Report of the Agricultural Department for 1929.

It might be said that this disease is not making any headway in St. Vincent. Th may be due to the fact that the island has recently experienced a series of comparatively dry years and as this nematode depends on water for its dissemination, the whole aspect of the position may change if a series of seasons of unusually high rainfall were experienced. The coco-nut industry is annually increasing in value and the fact that Red Ring is capable of doing extensive damage to the coco-nut plantations should not be lost sight of.

Arrowroot Worm *(Calpodes ethlius).*

This insect is found every year in arrowroot fields, at times in very large numbers, causing almost complete defoliation of the plants. The numbers found in fields during 1930 were negligible. These insects are greenish in colour, very delicate in appearance, with a skin so thin that a good deal of their internal ~~economy~~ anatomy can be distinguished. The butterfly (adult) is brown in colour with white spots on the wings, it is commonly found in cotton fields flitting from flower to flower. The eggs and the larvæ of this insect are attacked by the same parasites and predators as attack the cotton worm.

Attacks of the caterpillars can be controlled by the use of arsenical insecticides.

Other Pests.

Bronze Beetle (*Colaspis fastidiosa*). In the past these beetles have caused planters a considerable amount of trouble in that they attack young cotton plants by severing the stem at or near the base. There are definite periods, during which these and other beetles mature and appear in numbers as adults, the greater number appearing in the wet season, and the first broods during the early part of it. In the past when cotton was planted in June and July the emergence of this pest synchronised with the appearance above the ground of young cotton plants which provided them with material to destroy. When cotton planting commences in September it would seem from this and the previous year's experience that the young plants escape the attentions of this insect. Possibly in the

Autumn they remove to bush land to complete their life history. They dislike direct sunshine and one of the methods of control is thorough weeding of fields.

Sclerotium rolfsii. This is a fungus disease widely distributed throughout the world, at times causing the death of seedling cotton plants. It was not responsible for any material damage.

Black Scale (*Saissetia nigra*) and White Scale (*Hemichionaspis minor*) were both common towards the end of the season but not responsible for material damage.

Bush Bugs (*Nezaro viridula*) and others. The number of these insects found on various crops may be regarded as normal.

Sugar Cane.

Root diseases (*Marasmius sacchari*) Rind fungus (*Melanconium sacchari*) and Pine apple disease (*Thielaviopsis paradoxa*) were all present. The amount of damage done to the cane crop by the last three mentioned was possibly not great. During dry seasons and when sugar cane is growing on land of indifferent fertility, root disease seriously retards the growth of the crop.

Miscellaneous.

The usual pests were found on cacao, maize and coco-nuts, but none assumed serious proportions.

Tomatoes.

Fungoid Diseases.

The growing of tomatoes in St. Vincent is becoming of importance, and it is proposed to give an account of some of the fungoid and allied diseases that attack the crop in this island.

Blossom End Rot. This disease is found commonly on tomatoes in practically all islands of the West Indies, and is found on plants growing in every known type of soil. It is first noticed near the blossom end of the fruit as a dark green water soaked area, it may appear when the fruit is about half grown, but at times earlier. The patch becomes black and leathery and more or less sunken. As far as is known this disease is not caused by any parasitic organism, but is associated with physical conditions especially with variations in water supply. A sudden check to the water supply is one of the most usual ways in which the disease is induced, and it has been shown that continual excessive waterings produce the same effect. Aeration of the soil decreases the tendency to the disease, and lime has some effect in modifying the influence of heavy watering. It is stated that there is a distinct varietal difference in susceptibility to blossom end rot.

Septoria Leaf-Spot. Little of this disease was seen during 1930, but experience in the past has shown that it can be of a serious nature. The disease is caused by the fungus *Septoria lycopersici*, Speg. The disease is mainly one which attacks leaves beginning with small water soaked spots on the underside which dry into greyish white or dark circular spots, the spots are small, about half an inch in diameter, but they may join together and increase in size, in each there are a number of dark dots.

The lower leaves are first attacked, and as the spots become numerous, they become yellow, wither and fall. In severe attacks the disease spreads to successive younger leaves until only the terminal ones are left. The quantity and the quality of the fruit produced are effected in proportion to the injury to the leaves. The disease readily attacks young plants and seedlings.

In dry weather the disease does not spread, the causitive organism does not appear to tolerate drying; it does not thrive at a high temperature.

Training the plants on stakes reduces infection, periodically spraying with Bordeaux mixture gives good results.

Bacterial Wilt. This disease is moderately common on tomatoes in St. Vincent. It is unmistakable and results in the sudden wilting of the whole plant, and has the appearance which would be produced by severing the base of the stem from the roots. The disease is of a sporadic nature, and only attacks scattered plants (a plant here and there in the field). The organism which causes this is probably a wound parasite, and may be transmitted by insects or nematode worms. Every precaution should be taken to avoid injury to the roots when transplanting, or injury by hoes when weeding.

Bubbly Fruit Rot. Little is known about this disease but it is capable of causing destructive effect on fruit of any age. The outstanding character is the formation of watery bubbles under the transparent skin of the fruit, eventually the whole content of the fruit, except the seeds, is reduced to a slime. The infection takes place through a wound, and these may be caused through such insects as Bush Bugs, or by carelessness on the part of labourers. Bush Bugs may be controlled by the well known method of collecting ; every care should be taken not to injure fruit on the growing plants.

Plant and Animal legislation enacted during the year 1930.

An Ordinance No. 8 of 1930 was enacted to amend the importation of Plants Diseases Prevention Ordinance. This gives the Governor in Council power to prohibit absolutely by Proclamation or may admit, subject to such conditions as he in like manner prescribes, the importation of any fruit, (other than canned, candied, or processed fruits) vegetables, plants, cuttings, bulbs, roots, seeds or berries, or any earth or soil or any article packed therein or any covering or thing which in his opinion is likely to be a means of introducing any plant disease in the Colony.

Union Island.

The following table gives the rainfall recorded at Union Island during 1930. The readings were taken by the District Officer, Southern Grenadines.

Month.		Rainfall.
January	...	1·71
February	...	·78
March	...	·12
April	...	·79
May	...	1·54
June	...	1·73
July	...	2·05
August	...	1·33
September	...	2·42
October	...	4·00
November	...	2·47
December	...	3·72
Total	...	22·66

The rainfall for the year was very meagre, drought conditions prevailing most of the time.

Seeds of the improved Marie Galante cotton mentioned in the Report of 1929 are being increased for distribution purposes. Seeds of Broom Corn, Onions, Tomatoes, large quantities of Black Eye Peas, Sweet Potato cuttings, Cassava cuttings, etc., were sent to Union Island for distribution purposes.

Progress in Chief Industries.

Cotton Industry.

The return obtained from the Sea Island cotton crop for the season 1929-30 was 362,382 lb. of lint, the area planted was 1,758 acres, therefore the return per acre worked out at approximately 150 lb., this was the heaviest yield per acre for any one season for the past decade, with the exception of 1922-23, when a return of 162 lb. of lint was recorded.

Following the procedure of previous years, the appended tables are given. In these are put forward areas, the number of peasant and estate growers of cotton for the past two seasons.

TABLE 1.

1930-31.

			Sea Island.					
			Acres	R.	P.	Acres	R.	P.
1,427	Peasants, St. Vincent		1,657	1	6			
74	,, Bequia		27	2	34			
2	,, Battawia		18	0	0			
1,503						1,703	0	0
23	Large Growers, 44 Estates, St. Vincent		2,202	0	0			
2	,, ,, 2 ,, Grenadines		50	0	0			
25		46				2,252	0	0
		Total Sea Island				3,955	0	0

		Marie Galante.					
		Acres	R.	P.	Acres	R.	P.
217	Peasants, Union Island	704	0	25			
36	,, Canouan	72	2	0			
253	,,				776	2	25
2	Large Growers, Grenadines				265	0	0
	Total Marie Galante				1,041	2	25

TABLE 2.

1929-30.

			Sea Island.					
			Acres	R.	P.	Acres	R.	P.
530	Peasants, St. Vincent					432	0	0
23	Large Growers, 32 Estates, St. Vincent		1,301	0	0			
1	,, Grower, 1 Estate, Grenadines		25	0	0			
554		33				1,326	0	0
		Total Sea Island				1,758	0	0

		Marie Galante.					
		Acres	R.	P.	Acres	R.	P.
250	Peasants, Union Island	765	1	21			
39	,, Canouan	84	0	0			
289	,,				849	1	21
2	Large Growers, Grenadines				260	0	0
	Total Marie Galante				1,109	1	21

It will be seen from the above that the area under Sea Island cotton for the season 1930-31 was more than double that of the previous one, that under Marie Galante was about the same. The reason for this was the feeling of confidence which was created among growers by the success which followed the changing of the planting season. Figures as regards yield of lint for the crop are not available, reaping synchronised with the writing of this report. There is every indication that it will be most successful, possibly more so than that of 1929-30. Planters grew large areas of green dressing crops on the land before planting cotton seeds which not only helped to clean lands by smothering weeds, but added humus to it; a much needed commodity in St. Vincent soils. This is a point of importance and it is hoped that the practice will become a regular part of estate routine. The changing of planting season facilitates this.

Insect pests did little damage to the crop. Pink bollworm was no where greatly in evidence; there were several weak attacks of cotton worm, but they were mainly kept in check by predators and parasites, a large percentage of the eggs in the field were parasitised. Good weather was experienced during the season and there was but little trouble in getting the crop established. The lint produced was clean and white, being much superior to that obtained when the crop was harvested in the wet season.

In the following table the areas under Sea Island cotton for the past decade are given:—

TABLE 3.

Crops.	Area planted. Acres.	Weight of lint, lb.	Weight of lint, per acre, lb.
1921–22	2,909	278,744	93
1922–23	3,562	575,640	162
1923–24	3,387	473,248	140
1924–25	3,294	449,295	136
1925–26	4,893	585,483	120
1926–27	6,156	507,240	82
1927–28	3,364	328,188	97
1928–29	3,386	263,808	79
1929–30	1,758	2862,382	150
1930–31	3,955	600,000*	150*

* Estimated.

Following the procedure adopted in previous years the annexed table has been compiled. It shows the quantity of Sea Island cotton exported for the periods indicated.

TABLE 4.

Years.	Export of lint, lb.
1921	502,308
1922	338,279
1923	585,143
1924	520,368
1925	473,219
1926	588,793
1927	446,274
1928	349,246
1929	282,903
1930	256,167

The Sea Island cotton exported during 1930 was valued at £30,377.

The exports of Marie Galante cotton were 67,000 lb. of lint and 49,316 lb. of seed cotton; converting seed cotton into terms of lint we find that these figures work at approximately 79,329 lb. valued at £2,829.

Cacao Industry.

The following table gives the amount of cacao exported during the past decade :—

Years.	Weight, lb.
1921	139,135
1922	137,349
1923	121,374
1924	138,910
1925	154,821
1926	174,599
1927	135,490
1928	179,918
1929	156,405
1930	180,373

According to Treasury returns the cacao exported was valued at £3,761.

Starch.

In the Report on this Department for the year 1929 the question of the blending and grading of arrowroot and the organisation of an Arrowroot Pool to be conducted on the lines of the Canadian Wheat Pool was discussed. Since then the St. Vincent Co-operative Arrowroot Association has been formed, and although at first regarded by some people, especially peasants, with suspicion it subsequently gained the confidence of arrowroot growers.

The quantity of arrowroot exported during the year 1930 amounted to 3,590,348 lb. valued at £59,019. Of this amount the United Kingdom absorbed 1,496,300 lb. and the United States of America 1,084,536 lb. These figures are very much on a par with those for 1929. The remainder of the crop was sent to Barbados, Canada, Germany, France, Curaçoa and islands of the British West Indies.

The quantity of cassava starch exported amounted to 562,327 lb., a quantity that has only been exceeded once during the past decade. It was valued at £4,688. The bulk of the cassava starch was sent to Trinidad, this island absorbing 514,924 lb.

It might be stated that 1,367 lb. of farine was exported; this was valued at the sum of £13.

TABLE.

Year.	Arrowroot. lb.	Value. £	Cassava. lb.	Value. £
1921	2,093,358	21,216	156,888	1,366
1922	2,692,130	26,141	160,333	1,482
1923	2,177,182	31,829	366,085	3,700
1924	2,952,537	51,361	634,631	6,838
1925	3,190,412	53,174	470,284	4,160
1926	3,291,553	45,807	443,075	4,077
1927	3,195,487	53,309	543,681	4,940
1928	3,870,420	64,508	392,610	3,272
1929	3,573,759	59,563	551,512	4,595
1930	3,590,348	59,019	562,327	4,688

The above table gives the exports of arrowroot and cassava for the past ten years.

Syrup and Sugar Industry.

During the period under report 819 tons of sugar valued at £9,209 were exported from the island. In addition 183,786 gallons of syrup valued at £9,209 were sent out of the island.

£7,360

At this juncture it is fortunate that St. Vincent has not got large sums of money tied up in central factories. The Colony possesses one modern sugar factory, fortunately this has attached to it a rum distillery, which is as efficient, if not more efficient than any in the West Indies.

The exports of sugar and syrup for the past ten years are given :—

TABLE.

Year.	Sugar lb.	Value £	Syrup Gallons.	Value £	Total Value £
1921	322,560	3,514	117,157	9,878	13,392
1922	150,080	1,264	134,784	9,862	11,126
1923	145,944	1,863	275,932	18,711	20,574
1924	22,400	280	261,127	15,578	16,038
1925	...	...	268,118	19,672	19,672
1926	...	...	337,099	16,523	16,523
1927	839,000	6,947	171,063	10,496	17,443
1928	2,081,408	14,193	167,044	9,478	23,671
1929	2,408,000	14,095	287,941	12,562	26,671
1930	1,834,560	9,209	183,786	7,360	16,569

In the following table sugar has been equated into terms of syrup, and syrup into terms of sugar, it being estimated that 300 gallons of syrup are equal to one ton of sugar.

TABLE.

Year.	Syrup, Gallons.		Sugar, Tons.
1921	160,357	Equal to	543
1922	154,884	,, ,,	516
1923	295,432	,, ,,	984
1924	264,127	,, ,,	880
1925	368,118	,, ,,	1,220
1926	337,099	,, ,,	1,123
1927	283,563	,, ,,	945
1928	445,744	,, ,,	1,486
1929	610,441	,, ,,	2,035
1930	183,786	,, ,,	1,431

It will be seen from the preceding that there was a considerable decrease in the quantity and value of sugar exported during the year. This was to be expected when one considers the condition of the World's sugar market. The manufacture of sugar in itself was not profitable but the by-product, rum, helped to keep the industry alive.

Coco-nuts.

From the figures given below it would seem as though the coco-nut industry is not increasing, but it should be said that the returns from orchard crops vary from year to year; increased production of coco-nuts, and coco-nut products, may be looked for in the near future.

The following table gives the exports of copra and coco-nuts for the past decade:—

TABLE.

Year.	Quantity.			Value.	
1921	Coco-nuts	...	13,329	82	£ 1,435
	Copra	...	89,005	1,353	
1922	Coco-nuts	...	700	6	£ 2,349
	Copra	...	223,593	2,343	
1923	Copra	...	356,626		£ 2,959
1924	Coco-nuts	...	4,841	22	£ 5,452
	Copra	...	645,973	5,430	
1925	Coco-nuts	...	9,435	20	£ 5,532
	Copra	...	661,309	5,512	
1926	Coco-nuts	...	20,463	102	£ 9,928
	Copra	...	762,563	9,826	
1927	Coco-nuts	...	11,383	52	£10,135
	Copra	...	1,198,441	10,083	
1928	Coco-nuts	...	26,703	113	£12,656
	Copra	...	1,505,093	12,543	
1929	Coco-nuts	...	118,500	502	£11,898
	Copra	...	1,879,558	11,396	
1930	Coco-nuts	...	66,418	273	£11,585
	Copra	...	1,810,167	11,312	

For purposes of conversion it may be said that it takes three coco-nuts to make one pound of copra.

Progress in Minor Industries.

Maize (Indian Corn).

The quantity of maize exported was slightly more than during 1929, there being an increase of 112 bushels. The maize sent out of the Colony was valued at £210.

TABLE.

Year.	Export, bushels.
1921	1,683
1922	581
1923	4,696
1924	2,766
1925	2,754
1926	1,751
1927	1,901
1928	961
1929	808
1930	921

A bushel of corn was valued at 4/6.

Ground-Nuts.

The quantity of ground-nuts exported was slightly less than during the previous year, being 288,980 lb. which was valued at £3,610, or at the rate of 3d. per pound. The exports for the past ten years are given below :—

TABLE.

Year.	Export, bushels.
1921	5,584
1922	8,336
1923	8,803
1924	6,195
1925	5,251
1926	3,673
1927	5,067
1928	6,444
1929	6,902
1930	5,557

Peas and Beans.

The exports of peas and beans show a decided increase. This was due in part to planters growing large quantities as green dressings previous to the planting of the cotton crop but in some instances they were left sufficiently long in the ground to produce a crop.

In the following table the exports of peas and beans for the past ten years are given :—

Year.	Export, bushels.	Value £.
1921	2,637	1,472
1922	2,731	1,640
1923	2,482	1,595
1924	1,744	984
1925	1,548	866
1926	965	476
1927	745	352
1928	1,855	876
1929	3,398	1,673
1930	4,150	1,816

Miscellaneous.

The exports of vegetables were valued at £2,586, fruit £568, spices £1,950 and poultry £520. The fruit and vegetable trade of the Colony is discussed in the section "Report on the Government Fruit and Vegetable Bureau."

Rum Industry.

9,195 proof gallons of rum were exported and valued at £977. In 1929 only 2,776 gallons were sent out of the island. A total of 37,531 gallons were distilled.

Permanent Exhibition Committee.

St. Vincent did not participate in any exhibitions held in England during 1930. Arrangements were made to take part in the Ideal Homes and Grocers Exhibition, but these had to be cancelled. The carrying out in England of the work connected with exhibitions is in the hands of the West India Committee. The officers of the Committee had a considerable amount of extra work thrown upon their shoulders arising out of the sugar crisis in consequence of which the arrangements could not be carried out.

The Colony participated in the Nova Scotia Provincial Exhibition held at Amherst in August. At this, syrup, arrowroot, cocoa, cassava, ground-nuts, copra and cotton were sent to represent the major industries of the Colony. In addition Avocado pears, grafted mangoes and sweet potatoes were sent to represent minor industries, canned pine apples, tomatoes and various jellies were also sent. These, with native walking sticks, fancy baskets and three painted screens made a good show.

At Amherst a special effort was made to advertise St. Vincent arrowroot and some 5,000 one quarter pound packages were given away to visitors. These were neatly made, and each contained a number of recipes for the making of arrowroot into cakes, puddings, etc.

Horticultural, Industrial and Animal Show.

A Horticultural, Industrial and Animal Show was held at the Grammar School and Experiment Station Grounds on December 4th.

A Central Committee was formed with the Agricultural Superintendent as Chairman, and the Foreman, Experiment Station, acted as Secretary. In addition six gentlemen were appointed District Chairmen. Catalogues of seeds were obtained free and distributed, and offers were made by the Agricultural Department to import seeds or plants for any person requiring them. Six hundred copies of the Rules and Prize Lists were printed and distributed.

Meetings were held at Troumaca, Stubbs and Mesopotamia at which the Agricultural Superintendent spoke and tried to stimulate interest concerning the Exhibition among peasants. All Agricultural Officers when visiting holdings encouraged peasants to participate and distributed Prize Lists among them.

Placards and Leaflets were distributed throughout the island ; the Show was widely advertised in the local press.

It was held under the distinguished patronage of His Excellency Sir T. Alexander Vans Best, K.B.E., C.M.G., Governor and Commander-in-Chief of the Windward Islands, and under the auspices of the Imperial College of Tropical Agriculture. The date of the Exhibition was fixed for the day on which the Canadian National Steamship called. This gave His Excellency, and the Commissioner of Agriculture, an opportunity of attending. The boat did not arrive sufficiently early to allow His Excellency to open the Show, but he kindly distributed the prizes in the afternoon. The function was officially opened by His Honour Major Peebles, D.S.O., O.B.E.

There were over 600 exhibits sent in, the standard of these varied considerably ; this was to be expected as such an Exhibition as the one under discussion had not been held in St. Vincent for over twenty years. Some excellent horses, cattle and pigs were shown. The fruit and vegetable classes were well represented but the class for preserves was not ; Needlework was excellent and the exhibits in the photography class were very good. The School exhibits indicated that considerable efforts had been made by the children.

The Government Fruit and Vegetable Bureau had a special section, in which such fruit as avocado pears, tomatoes, grape fruit, oranges, etc., packed in their respective standard crates and graded as for export, were shown. In addition various preserves as guava jelly, guavas preserved, raspberry jelly, etc., with canned pine apples and tomatoes made an excellent exhibit.

His Honour the Administrator had a special marquee in the centre of the grounds in which was tastefully displayed all the products of the island. A special feature was a glass case in which was shown flowers in ice. A section of this was devoted to the work done in the local Industrial School which His Honour had recently established. In this there was carpentry, wood carving, etc., done by the boys, and dressmaking, fancy work, etc., done by the girls.

There were a number of side shows which consisted of fortune telling, hoop-la, coco-nut shies, etc. A successful tea room was run by a Committee of ladies.

The day was brought to a conclusion by a spectacular display of fireworks which were imported by Major Peebles who personally supervised the display.

The Exhibition was a distinct success which only could have been achieved by the unstinted help given by a number of ladies and gentlemen.

Visit to St. Vincent of Professor Cheeseman, Professor of Botany, Imperial College of Tropical Agriculture.

Professor Cheeseman, Professor of Botany, Imperial College of Tropical

Agriculture, visited St. Vincent in February, with the view of investigating the cotton situation. He subsequently submitted a Report on his findings. In this he dealt with the general condition of the crop, the genetic status of St. Vincent cotton, the details of investigation, future policy, and finally he made technical suggestions. The Report was necessarily of a technical nature and was an exceedingly valuable one. As a result of this a Cotton Research Officer was appointed who took up the duties of his office in August. His salary is paid from funds provided by the ~~British~~ Empire Cotton Growing Corporation.

Visit to St. Vincent of Mr. G. A. Jones, Assistant Commissioner of Agriculture.

During the months of February and March Mr. G. A. Jones, Assistant Commissioner of Agriculture, visited St. Vincent, and the following is a resumé of parts of the Report he made.

A point of great importance to St. Vincent planters is touched on in connection with manurial practice in this Island. It is truly pointed out that lack of manure results in poor crops and in increased cost of production. The question of maintaining and adding humus to the soil is dealt with, and the ways suggested are as follows :—

(*a*) By carrying more live stock and growing fodder especially for this purpose.

(*b*) By growing in a purpose and methodical way green dressings to be turned into the soil at the proper time. This is probably the most economical and practical method. The soil and climate conditions in St. Vincent are such to enable the planters to do this at a very reasonable cost.

(*c*) Most of the land now being cultivated in St. Vincent is too steep for profitable cropping and could best be utilized as a source of mulch for the better lands. These steep lands might be planted in Gliricidia and such grasses as Lemon grass, Guatemala grass and Cus-Cus grass and the growth periodically cut over and the material carted to those portions of the estate under cultivation. On the windward side of the Island, crops suffer much from wind; belts of trees planted at frequent intervals would serve the double purpose of sheltering the crops and providing material for mulching.

It is indicated that the arrowroot market is a limited one, and that if plants can cheapen cost of production, it will be possible to sell at competitive prices against other starches, and endeavours to do this should be made by means of more adequate manuring, and by substituting for the hoe modern methods of cultivation. Methods of manufacture of starch are discussed and it is suggested that the adoption of modern machinery for manufacturing purposes should receive the most careful consideration of planters.

The status of the cotton industry is discussed, and again the question of the liberal manuring of land is stressed, and evidence for experiments undertaken by the Agricultural Department show that definite and remunerative results follow the application of comparatively small amounts of potash. The remark is made that "the quantity of this manure imported into the island is negligible."

It is stated that the sugar industry is a very useful one and one admirably suited to the conditions in St. Vincent, one great point in its favour being the fact that it is an excellent rotation crop, and that the washing of the soil on steep hillsides is largely prevented by the roots and the trash of cane, the trash providing much organic matter. With this crop the live stock necessary for reaping produces large quantities of pen manure. It is pointed out that the canes on one estate were remarkably free from insect attacks and disease, but that they were too trashy, and in many instances the tops had not been removed. Badly cut and

unclean canes add nothing to the sugar going into the factory, but effect detrimentally the recovery of sugar.

The Report points out that the development of the coconut industry in St. Vincent is a very recent one, it being first mentioned in the Reports on the Agricultural Department in 1911-12, since when it has developed into an industry worth more than £12,000 per annum, and further continuous increases may be looked for as time progresses. It is stated that St. Vincent possesses probably one of the largest unbroken stretches of coconut plantation in the West Indies. A suggestion of importance was made in connection with the manuring of this crop. After pointing out that the most difficult problem is to maintain the humus content of the soil, the Report says "that by increasing the distance between the rows to 40 feet and closing in a bit on the distance of the trees in the rows it would be possible to grow a crop of lemon grass or some other grass on a strip of say 15 feet between the rows that might be used for mulching purposes." A point made, and one of importance, is that as a source of employment of labour coconut cultivation is of little value, it being usually assumed that one labourer to 5—7 acres is sufficient against, say one man per acre of sugar cane. In certain parts coconuts are being planted on steep hillsides, and it is pointed out that it is somewhat doubtful whether this crop will thrive under such conditions.

When dealing with minor products, live stock is mentioned, and it is indicated that co-operative effort is required to maintain and improve the Island's stock.

The development of new industries is discussed at length. It states—"Largely due to the initiative and the energy of Major Peebles, the present Administrator, a very real effort is being made to develop a fruit and vegetable industry in the Colony. During the last few months there has been established a Government Fruit and Vegetable Bureau and a very useful start has been made in grading, packing and shipping fruit for export to Great Britain, Canada, Bermuda and elsewhere. The bulk of the fruit and vegetables have been grown by peasants and without the Bureau no progress would have been possible."

Under this head such crops as tomatoes, avocado pears, grafted mangoes and citrus are mentioned. As regards tomatoes it states that "there are considerable possibilities for this crop in the island and as the market is available in Canada it is hoped that both estate owners and peasants will take up this cultivation energetically." The season is from January to June and the hope is expressed that 1,000 crates should be shipped during these months.

As regards avocado pears, it is stated that the best type to ship should be green in colour, possess a hard skin, and have a tight fitting seed and a high percentage of fruit to stone. There are a number of trees in the island that yield fruit of this description.

Mr. Jones pointed out that a very useful market could be developed in high class mangoes, and suggests that many common mango trees growing in the Island could be converted into trees bearing high class fruit by means of patch budding.

The question of growing citrus fruit is carefully considered. It is stated "It is somewhat remarkable that generally speaking St. Vincent does not appear to be an Island well suited to the growing of citrus in spite of an ample rainfall and favourable soil conditions." The attempts made to grow citrus plants are carefully reviewed, but the opinion is expressed that sour orange was not used in the past as a stock for budding purposes, and that this which has a deep rooting system should be given a trial ; other stocks should also be tried. It is emphasised that the greatest care should be exercised when planting out citrus and only the most promising sites chosen. Sheltered valleys should be selected, and wind breaks of trees established to furnish further protection. Citrus plants when exposed to wind become an easy prey to scale insect attacks.

In reviewing peasant agriculture, in connection with persons owning land on acquired estates, the opinion is expressed that "the general appearance of these

settlements is one of contentment and relative prosperity." Other matters of importance, which are of a departmental nature, are reviewed in this report.

Agricultural Instruction, Education and Co-operation.

The Report on Agricultural Credit Societies appears in another part of this publication. Agricultural Officers paid frequent visits to estates and peasant holdings during the year. The Agricultural Superintendent attended and addressed twenty-seven meetings, each dealt with matters pertaining to agriculture.

Science Teaching.

This is done by the Science Master attached to the Grammar School.

Details of Staff and Administration.

The sum of £1,661 was voted for the upkeep of the Agricultural Department. The following gives details of expenditure :—

	£	s.	d.
Salary, horse and travelling allowance, Agricultural Superintendent	450	0	0
Salaries, Foremen, Botanic and Experiment Stations, Cotton Inspector, Officer in Training and Clerical Assistant, and horse and travelling allowances, Agricultural Instructor and Cotton Inspector ...	446	0	0
Upkeep Botanic and Experiment Stations, (labour, tools, manures, etc.)	587	4	3
Destruction of food plants of the Cotton Stainer ...	10	16	11
Salary, horse and travelling allowance, Government Vaccinating Officer	30	0	0
Other charges, Government Veterinary Department	22	0	0
Special Cotton Investigations	19	0	9
Total	£1,565	1	11

Staff.

The Agricultural Superintendent returned from four months leave on March 19th.

Mr. F. Simmons, Foreman, Experiment Station and Agricultural Instructor, was seconded for duty under the Grenada Government in June. The absence of this Officer has placed the Department to inconvenience.

The Agricultural Superintendent attended the Fruit Conference at St. Lucia. He was away from headquarters from December 4th to 16th.

Receipts.

The receipts for sale of produce at the Botanic and Experiment Stations, amounted to £90. 17. 5.

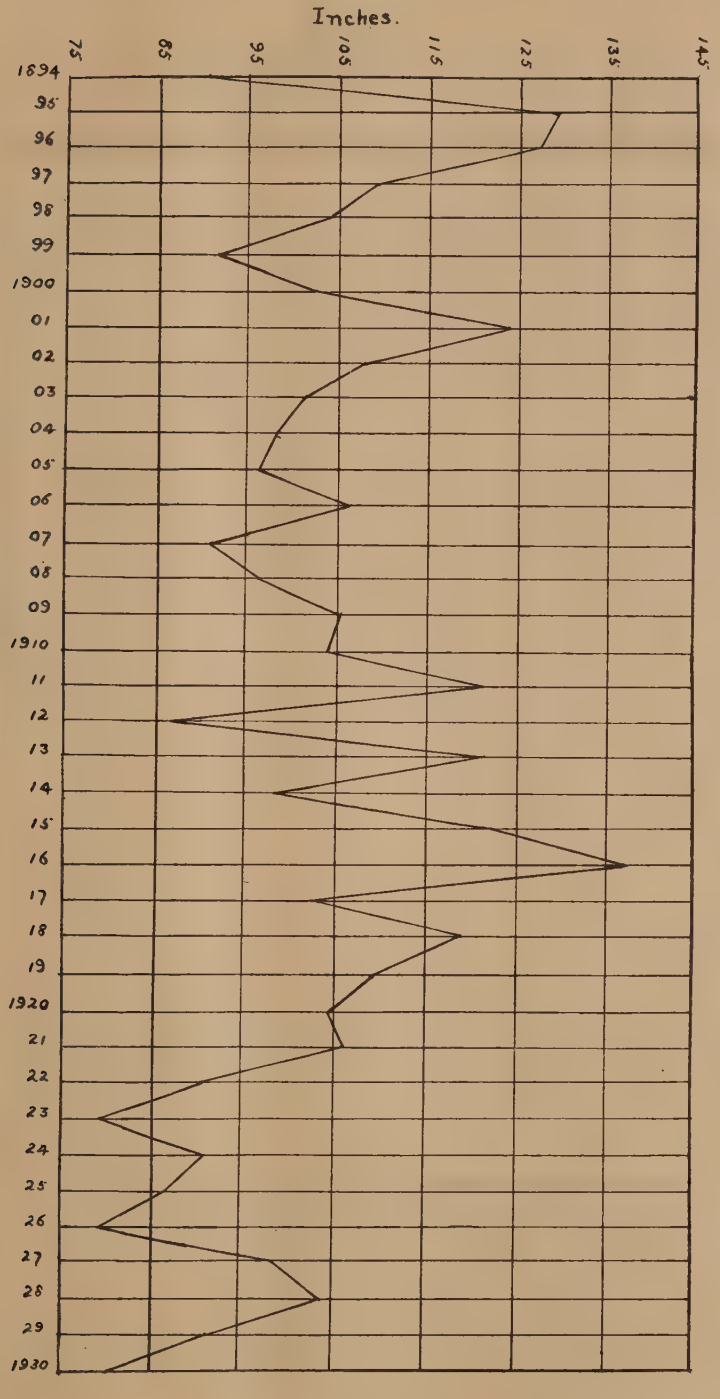
Correspondence and Distribution of Information on Agricultural Matters.

The number of minute papers dealt with amounted to 436 and the number of letters despatched was 735. In addition 210 reports and 132 leaflets were distributed.

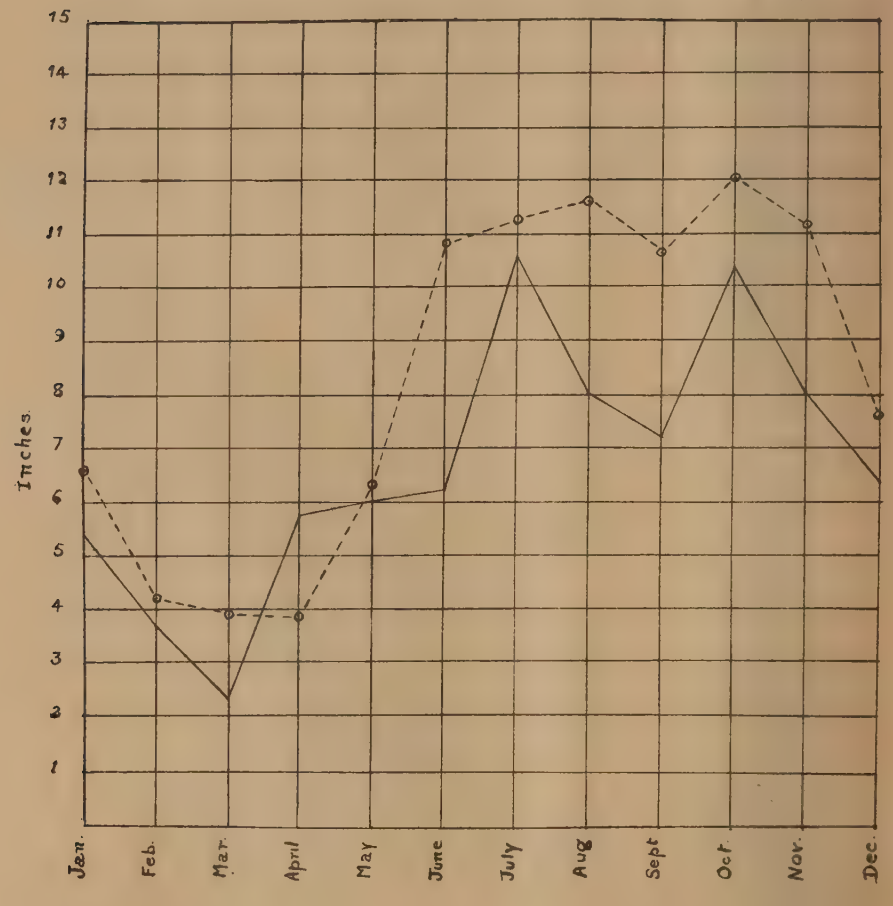
Meteorological Observations.

The average rainfall at the Botanic Gardens for the past 37 years was 103·28 inches. The rainfall for 1930 was 80·47 inches. It was therefore 22·81 inches below the average.

Annual Rainfall, Botanic Gardens, St. Vincent, 1894-1930



Monthly Rainfall, Botanic Gardens, St. Vincent, 1894-1930.



Black line represents Monthly Rainfall, 1930.

Dotted line represents mean Monthly Rainfall, 1894-1930.

At the Botanic Gardens rain was recorded on 269 days ; the heaviest fall was on October 10th when 2·28 inches fell. Rain was recorded at the Experiment Station on 227 days, the heaviest fall was on July 24th when 2·01 inches were measured.

The following table gives the mean temperature, average degree of humidity and the mean barometric pressure in inches for each month during the year :—

METEOROLOGICAL OBSERVATIONS, EXPERIMENT STATION, FOR 1930.

TABLE.

Month.	Mean Temperature F°.	Average degree of humidity Saturation 100.	Mean barometric pressure in inches.
January ...	77·0	73·0	29·898
February ...	77·4	70·8	29·970
March ...	79·3	67·5	29·994
April ...	79·8	68·5	29·951
May ...	80·6	72·5	29·987
June ...	80·7	73·9	29·954
July ...	81·1	72·0	29·983
August ...	81·6	69·2	29·974
September ...	81·1	74·5	29·941
October ...	81·7	76·4	29·917
November ...	80·2	72·6	29·915
December ...	79·4	69·6	29·935

Atmospheric Pressure.

The reading of the barometer, corrected for instrumental error, elevation, temperature and latitude, ranged from 30·123 on May 31st to 29·856 on October 15th.

The following gives the rainfall recorded at the various stations for 1930 :—

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.
Richmond Vale ...	7·00	4·31	1·85	4·81	3·84	7·46	13·88	9·86	8·30	9·08	10·77	6·42	87·58
Botanic Gardens ...	5·42	3·73	2·38	5·77	6·09	6·29	10·50	8·08	7·28	10·41	8·04	6·48	80·47
Experiment Station ...	5·29	2·70	1·61	4·58	5·09	6·50	8·80	6·89	7·38	9·29	7·63	3·54	69·30
Cumberland ...	5·02	1·46	0·88	2·79	3·18	6·49	10·72	6·81	4·97	5·59	9·95	2·34	60·20
Grand Sable ...	2·84	2·39	1·55	3·64	3·53	4·86	5·72	5·12	5·04	4·52	12·73	2·39	54·33
Bequia ...	2·98	1·72	2·25	4·35	3·54	5·96	9·30	4·25	4·56	5·40	5·84	4·05	54·20
Argyle ...	2·51	3·38	1·13	3·02	2·95	3·99	4·42	3·83	3·34	8·59	7·68	4·55	49·39
Peters Hope ...	4·95	1·03	0·55	1·74	2·28	5·32	8·34	5·18	4·00	5·15	6·48	3·20	48·22
Brighton ...	2·37	1·22	·61	2·55	4·03	4·73	3·91	5·21	5·26	4·47	5·67	2·30	43·33
Union Island ...	1·71	0·78	0·12	0·79	1·54	1·73	2·05	1·33	2·42	4·00	2·47	3·72	22·66

Official Visitors.

In February, Professor E. E. Cheeseman, Professor of Botany, Imperial College of Tropical Agriculture, Professor H. A. Ballou, Commissioner of Agriculture for the West Indies, and Mr. G. A. Jones, Assistant Commissioner of Agriculture for the West Indies, visited St. Vincent. The object of Professor Cheeseman's visit was to investigate the condition of the cotton crop. Mr. Ballou's and Mr. Jones' visit dealt with agriculture generally.

In April, Mr. K. T. Rae, Superintendent of Agriculture, Grenada, accompanied by Mr. De Gale of Grenada paid a visit to the island. The object of this visit was to study matters pertaining to the Fruit and Vegetable Bureau.

Other Officials who landed for a short period and visited the Botanic and Experiment Stations were, Mr. G. Evans, Principal, Imperial College of Tropical Agriculture, Professor Ballou, Commissioner of Agriculture for the West Indies (on three occasions), Dr. J. G. Meyers, Imperial Institute of Entomology, Dr. Harland, Genetist, Empire Cotton Growing Corporation and Mr. Jones, Assistant Commissioner of Agriculture.

Veterinary Report.

The microscopic examination of ears of animals for anthrax was performed at the Colonial Hospital.

The total sum expended on Veterinary work was made up as follows :—

	£	s.	d.
Salary and travelling allowance, Government Vaccinating Officer	30	0	0
Burial of Carcasses	22	0	0
Total	£52	0	0

Anthrax.

No cases of anthrax have been recorded in St. Vincent since 1914.

Exports.

The following gives the number of animals exported for which no certificates were given :—

TABLE A.

Class of Animal.	Number.	Value £.
Sheep ...	634	354
Goats ...	2,180	742
Pigs ...	1,693	3,147
Total ...	4,507	4,243

TABLE B.

Showing kind, number and value of stock for which veterinary certificates were given, also the places to which the animals were exported.

Class of Animals.	Barbados.		Trinidad.		Grenada.		St. Lucia.		Curaçoa.		Total.	
	No.	Value £.	No.	Value £.	No.	Value £.	No.	Value £.	No.	Value £.	No.	Value £.
Cattle ...	27	182	34	131	9	34	9	36	2	10	81	393
Horses ...	6	93	...	...	...	...	...	...	...	...	6	93
Mules ...	2	27	...	...	...	...	...	...	...	...	2	27
Asses ...	41	79	6	12	...	...	...	...	...	...	47	91
Total ...	76	381	40	143	9	34	9	36	2	10	136	604

Table C.

Twenty-eight animals valued at £359 were imported. All, with the exception of the mules were imported for breeding purposes. The following gives the kind and value:—

Class of Animal.	Number.	Value £.
Cattle ...	5	67
Goats ...	4	6
Sheep ...	10	40
Pigs ...	3	6
Mules ...	6	240
Total ...	28	359

Certificates were granted for 2,559 hides and skins, valued at £169. Six hundred and twenty-eight were exported without certificates which were valued at £108.

Table D.

Showing deaths of animals in district from natural causes.

District.	Cattle.	Horses.	Asses.	Goats.	Pigs.	Total.
Kingstown ...	11	...	4	2	4	21

Table E.

Showing deaths of animals in each month of the year ended December 31st, 1930.

Months.	Cattle.	Asses.	Goats.	Pigs.	Total.
January ...	1	1	...	1	3
February ...	...	...	...	...	...
March ...	...	2	...	...	2
April ...	1	...	...	...	1
May ...	2	...	...	...	2
June ...	1	...	...	...	1
July ...	...	...	...	...	...
August ...	1	...	...	...	1
September ...	...	...	...	1	1
October ...	1	1	...	2	4
November ...	2	...	2	...	4
December ...	2	...	...	...	2
Total ...	11	4	2	4	21

Report on the Agricultural Credit Societies.

Quite recently Professor Shephard, Professor of Economics, Imperial College of Tropical Agriculture, visited St. Vincent with the view of looking into the affairs of these Societies and to make suggestions for the re-organization of them. He visited various parts of the Island accompanied by the Manager, Government Fruit and Vegetable Bureau, and the Cotton Officer. His report when received will undoubtedly be of interest.

There are various suggestions put forward at the present time in connection with the furthering of settling peasants on the land. In recent years, since approximately pre-war days, little has been done with reference to extension in this direction, although this Colony has gone further than any other in the West Indies. There are numerous peasants settled happily on their own allotments and there is no reason why this number should not be augmented. Land Settlement Schemes when inaugurated and Agricultural Credit Societies should dove tail, to a very great extent. The Agricultural Department of St. Vincent is weak and it was further weakened during the year by the fact that the Foreman, Experiment Station was seconded for duty in the Grenada Agricultural Department in June. This Officer was attached to the Department for over twenty years, and was extremely useful in connection with agricultural instruction work.

The following gives a short account of the four Societies that are now functioning:—

Clare Valley Questelles. Of the two loans amounting to £72. 18. 4, contracted in August last, £50 has not been repaid. These loans are obtained from private sources at the rate of 7 per cent. The interest has been paid.

Redemption. This Society has repaid all loans.

Troumaca. This Society has not paid off loans contracted in 1928. This was for £100 from a Provident Society and £90 from a Temperance Society. The interest is at the rate of 6 per cent. It might be said that many members of the Agricultural Credit Society are also members of the Provident and the Temperance Society.

Georgetown. This Society has paid off all loans.

Statement of Transactions.

	£	s.	d.
Loans obtained in 1930	50	0	0
Total loans obtained since their inception ...	36,278	8	4
Interest on loans during 1930	10	0	0
Loans outstanding other than those contracted in 1930	212	18	4

REPORT ON GOVERNMENT FRUIT AND VEGETABLE BUREAU 1930.

This section was written by Mr. M. T. Horner, Manager, Government Fruit and Vegetable Bureau.

During the year the Bureau exported the following produce:—

Produce.	Crates.	Lbs.	Gallons.
Avocado Pears ...	555		
Beet-root ...	3		
Cabbages ...		720	
Cucumbers ...	15		
Eschallots ...		400	
Ginger ...		350	
Guava Jelly ...		252	
Grapefruit ...	121		
Honey ...			10
Limes ...	150		
Lime Juice ...			765
Mangoes ...	236		
Mace ...		230	
Nutmegs ...		1,610	
Oranges ...	30		
Onions ...		2,350	
Pumpkins ...		4,750	
Peanuts ...		2,200	
Peas ...		660	
Pineapples ...	5		
Potatoes ...		784	
Tangerines ...	5		
Tomatoes ...	674		
Yams ...		640	
Totals ...	1,794	15,036	775

The export of avocado pears was developed during the year, tray crates were adopted as being the best package for this product. Exports were chiefly to Bermuda where arrangements were made for shipping on a f.o.b. basis ; this method is more desirable than shipping on consignment. During the season shipments increased from 12 to 75 crates per mail ; the quality was maintained, therefore our agent has established a connection throughout the Island, and states that he is now in a position to handle more cases than previously. On shipments to England good prices were maintained with the exception of one shipment of 20 trays which arrived according to the Broker's report "with the skin of the fruit hard and shell-like, but what should have been flesh was almost liquid," from this description it would appear as though the fruit had been frozen.

Beet and cabbages were shipped to Barbados and sold at remunerative prices.

Cucumbers were shipped to Canada and sold for twelve and six pence per bushel crate containing 50 cucumbers, a smaller package containing 20 to 25 might prove more profitable.

A good market exists for guava jelly in Bermuda and St. Thomas ; the cost of containers however, prevents further expansion of this trade at present.

It would be advisable to confine shipments of grapefruit to Barbados till such varieties as Marsh Seedless, Duncan, Standard etc. are established.

A steady price for green limes was maintained ; the market for lime juice however, was depressed in sympathy with other produce. There has been a moderately brisk demand amongst peasants and planters for lime plants particularly those inarched on sour orange stock.

Mangoes exported were chiefly the common types which were sent to Bermuda. This market is however, easily flooded, and agents in that Island are apt to speculate at the expense of shippers on consignment. "Julie" mangoes shipped to England realized very good prices ranging from 4d. to 1/- per fruit.

Two thousand three hundred and fifty pounds of Onions were exported, this is no guide to the amount grown as the local market is a good one. It has been demonstrated that Onions of excellent quality can be grown in certain parts of St. Vincent, when it is remembered that Onions valued at £350 are imported annually, this alone should encourage small holders to cater for the local market as well as other West Indian markets.

Pumpkins have become a regular item of export, orders have increased from 180 to 1,200 lbs per mail ; a steady price has been maintained. As no special cultivation is necessary for Pumpkins, the vines generally run through other crops, the growers look upon the produce as clear profit. Pumpkins are particularly adapted for shipping, keeping in a sound condition for several weeks in ordinary storage. It is hoped to further develop the export of this useful vegetable.

Tomatoes grow in practically any part of the Island, and providing the plants receive the necessary care, fruit of an excellent quality can be produced. Too much stress cannot be laid on the necessity of keeping the plants off the ground and eliminating the sheets which grow at the juncture of each leaf. A quantity of fruit has come to the Bureau useless for shipping owing to malformation consequent on allowing plants to grow without pruning. The fruit from plants grown under these conditions never has the healthy green appearance of those receiving proper attention; much useful work can be done therefore by having in the various districts, in addition to nurseries, demonstration plots of the various fruit and vegetables suitable for the Canadian Market. It is gratifying to know that His Honour the Administrator has started a scheme of this nature in the centre of one of the Land Settlement areas.

The first shipment of Tomatoes to Canada was made on January 30th, and during the following three months two hundred and seventy nine crates were shipped to St. John. The results were excellent, the price per 20 lb. crate ranging from $1.80 to $2.25.

Planting started in September, and on December 4th, a shipment of twenty five crates was made to Canada. During the month two hundred and thirty one crates were shipped. Keen interest is being taken in tomato growing especially in the "Mesopotamia" district where arrangements have been made to establish a packing house.

It was found that a considerable proportion of the fruit from this district arrived at the Kingstown Packing House, in a bruised condition, as the growers live from nine to fourteen miles from the Kingstown Packing House, and the methods of transport being of a primitive nature, packing in this district has proved of considerable benefit to Tomato growers.

The fruit is arriving in Canada in good condition, our agents state "Your Tomatoes compare very favourably with the other Islands, and we cabled you that we could use a second quality Tomato." A proportion of the crop has been lost owing to the lack of a pre-cooling plant.

The 1930–31 crop of Tomatoes shows promise of being anything from three to five thousand crates. Samples of canned tomatoes sent to England were reported on by the Empire Canning Council, the report is signed by Dr. Stanley Smith, O.B.E., and the following is an extract :—

CANNED TOMATOES.

Labelled "Choice Quality".

St. Vincent.

B.W.I.

"The contents of the tin container labelled as above, represents a genuinely attractive commercial proposition.

The Tomatoes possess a delicious aroma, whilst the flavour is all that could be desired. The condition of the fruit was excellent, in regard to culinary requirements, and displayed the qualities associated with "home grown tomatoes".

Mrs. Ettie Hornibrook, the food expert, to whom a tin was sent says "I have tested the tin of tomatoes you kindly gave me—Carib Brand, St. Vincent, packed by the Government Fruit and Vegetable Bureau. These are quite the best tinned tomatoes I have ever tasted—there is no "tinny" taste at all ; the colour is also much better than anything I have yet seen ; the odour and flavour are very excellent. In fact, in taste, appearance, and aroma these tinned tomatoes are equal to the very best fresh tomatoes, and such fresh tomatoes are available in England only for a short time at comparatively high prices. I should think that the Vitamin C content had been uninjured."

Nurseries were established at the following places, the appended table gives the number of plants distributed from each :—

	Tomatoes.	Onions.	Limes.
Fountain ...	12,000	25,000	
Mesopotamia ...	39,600	10,500	
Troumaca ...	32,600	12,500	1,024
Stubbs ...	19,600	17,600	
Layou ...	...	12,500	
Totals ...	103,800	78,100	1,024

Botanic Gardens } The figures for these are given in another part of
Experiment Station } this publication.

Seed distribution consisted of:—

100 lbs. Broom Corn Seed.
10 „ Miscellaneous Vegetable Seed.
108 „ Onion Seed.
40 „ Tomato Seed.

258 lbs. — These were issued to 566 applicants.

Meetings were held at Mesopotamia, Troumaca and Stubbs, the centre of Land Settlement areas.

It will be seen that a considerable amount of work has been done by the Government Fruit and Vegetable Bureau, much of which must be regarded as of a pioneer nature, results from such cannot be of immediate moment and can only be expected to accrue in the fullness of time.

Should there be an extension of Land Settlement areas in St. Vincent the work of the Bureau would form an integral part of their development.

FINANCIAL STATEMENT OF GOVERNMENT FRUIT AND VEGETABLE BUREAU DECEMBER, 1930.

Dr.	£ s. d.	*Cr.*	£ s. d.
Dec. 1930.			
Amount advanced by Treasury	345 6 5	By value of crates ...	139 11 0
Due Government Cotton Ginnery ...	101 6 8	„ Baskets ...	16 0 10
Balance due on Crates ...	97 6 7½	„ Labels ...	56 5 8
		„ Cash in Bank £41 11 2½	
		„ „ „ Hand 4 1 1	45 12 3½
		„ Produce shipped and not yet accounted for ...	85 4 2
		Value of Produce in hand ...	14 9 6
		„ „ Preserves ...	25 10 6
		„ „ Empty bottles ...	9 7 11
		„ „ Tins ...	2 16 3
		Machinery £51 6 0 less 10% ...	46 3 5
		Excess Liabilities ...	102 18 2
	543 19 8½		543 19 8½

REPORT ON THE WORKING OF THE GOVERNMENT COTTON GINNERY FOR THE PERIOD 1ST OCTOBER, 1929 TO 30TH SEPTEMBER, 1930.

The following section was prepared by the Manager of the Government Cotton Ginnery :—

Ginning and Baling.

There were 630,674 lb. of seed cotton received for ginning, of which 577,692 lb. white and 119,992 lb. stained, making a total of 607,915 lb. Although an increase of 22,759 lb. is shewn in the totals the quantity received was still below a normal year's average, and this was due to the fact that many persons reduced the area normally put under cultivation of cotton because they felt some uncertainty over the change in season.

It will be observed that the stained cotton was less than 50 per cent of the previous year's figures—this was due entirely to the change in the planting season.

During the season 1929-30 the lint obtained from the white cotton was 160,174 lb., and from the stained 14,290 lb., making a total of 174,464 lb. The figures for the previous year were 128,070 lb. from white cotton and 30,436 lb. from stained, giving a total of 158,506 lb. so that there was an increase of 15,958 lb. in the totals. There was a rather marked increase in the percentage of lint to seed cotton during the year under review, and while there can be no doubt that this was due to the change in season, there arises the question whether or not the cause was a decrease in the moisture content of the seed or the production of a coarser lint in consequence of the ripening of the cotton during a dry season or both. This may be a matter for close observation by the Cotton Research Department. Whatever may have been the cause of this perceptible rise in the percentage of the lint to seed cotton, it certainly was not due to the better drying after the cotton was reaped from the fields, because the rise was quite as perceptible in the case of certain estates which were noted for proper drying of cotton before the change in the planting season was made.

Oil Expressing and Refining.

Oil was expressed from 772,612 lb. of seed, 191,911 lb. of which were received from the Kingstown Cotton Factory and 200,822 lb. from the Union Island Ginnery—the seed from this last mentioned ginnery having been obtained from Marie Galante cotton. During the previous season oil was expressed from 758,466 lb. of seed, so that the year under review showed a small increase of 14,146 lb.

The Ginnery continued to refine the crude cotton seed oil for sale locally. The competition which had to be met in the endeavour to dispose of the refined oil was keener than it has been during the past six years, and was influenced not only by the general low prices ruling for practically all products, but also by the installation of a coconut oil plant in the neighbouring island of Trinidad from which oil was imported and used as a substitute for cotton seed oil.

The quantity of oil refined for the season was 5,969 gallons and 4,535 bars of soap were manufactured from the residue of the oil refining vat.

Purchase of Cotton on the Co-operative System.

The total quantity of seed cotton purchased for the season was 91,328 lb., of which consisted of 85,892 lb. of white Sea Island and 5,436 lb. of stained. The advances paid were 4d. per pound for white and 1d. per pound for stained, which were the same rates as those paid during the previous season. The quantity purchased during the preceding year was 158,601 lb. made up of 130,794 lb. of white and 27,807 lb. of stained. There was therefore a decrease of 67,273 lb. in the total quantity purchased. The lint obtained was 23,807 lb. from white seed cotton and 1,544 lb. from the stained, making a total of 25,351 lb.

There were 35 bales of white cotton and 4 bales of stained from the 1929-30 crop remaining unsold at the close of the year.

A bonus of 40 per cent was paid on the cotton purchased during the previous season.

Purchase of Corn on the Co-operative System.

Corn purchased for the season consisted of 3,010 lb. of shelled and 547 lb. on the cob, which yielded 3,129 lb. of kiln-dried corn. Figures for the preceding year were 113,118 lb. of shelled corn and 36,599 lb. on the cob. The Advances paid were at the rate of $1.25 per 100 lb. for shelled, and 88 cents per 100 lb. on the cob.

The very small quantity purchased was due to the fact that most of the corn was formerly grown as a catch crop with cotton, and as the cotton planting season commenced much later in the year growers preferred to plant little or no corn among the cotton.

Other Transactions.

5,214 lb. of corn were kiln-dried, 7,600 lb. were shelled and 63,833 lb. were ground into meal or stock-feed. 6,829 lb. of cotton seed were selected and disinfected for planting and 1,708 lb. were selected without being disinfected. Stained cotton seed was disintegrated for use as manure, the quantity treated being 36,868 lb. Grain, etc., fumigated and stored amount to 32,639 lb.

The summary of transactions for the last two years is as follows :—

	1928-29.	1929-30.
Seed Cotton received and ginned -	607,915 lb.	630,674 lb.
Cotton Seed expressed -	758,466 ,,	772,612 ,,
,, ,, disintegrated -	132,967 ,,	36,868 ,,
Seed Cotton purchased -	158,601 ,,	91,328 ,,
Corn purchased -	149,717 ,,	3,557 ,,
Corn kiln-dried -	123,764 ,,	5,214 ,,
Corn shelled -	30,493 ,,	7,600 ,,
Corn ground into meal or stock-feed	47,620 ,,	63,833 ,,
Cotton Seed selected and disinfected for planting -	6,454 ,,	6,829 ,,
Cotton Seed selected only -	2,235 ,,	1,708 ,,
Grain, &c., fumigated and stored -	31,626 ,,	32,639 ,,
Cotton Seed Oil refined -	6,484 gals.	5,969 gals.
Soap manufactured -	7,461 bars	4,535 bars
Cotton Seed Meal delivered -	350 tons.	295 tons.

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